

Claims

1. Foamable compositions which are usable for the manufacture of foamed, flexible, heat resistant, thermoplastic elastomeric articles, and which comprise at least:
 - (a) 100 parts by weight of one or more selectively hydrogenated block copolymers, having at least two resinous blocks A of non-hydrogenated predominantly polymerized monovinyl arene, and a selectively hydrogenated elastomeric block B, wherein said block B prior to hydrogenation being predominantly a polymerized conjugated diene or dienes, said block copolymer having a total apparent molecular weight of at least 250 kg/mole and preferably at least 350 kg/mole, and containing polymerized monovinyl arene blocks of true molecular weight of at least 18 kg/mole,
 - (b) 5 to 50, preferably from 15 to 40 parts by weight of one or more selectively hydrogenated block copolymers having at least two resinous blocks A' of non-hydrogenated predominantly polymerized monovinyl arene, and an selectively hydrogenated elastomeric block B', wherein said block B' prior to hydrogenation has been derived from a polymerized conjugated diene or dienes as a major component which may be mixed with minor proportions of other copolymers (e.g. vinyl aromatic) i.e. ≤ 25 wt%, and said block copolymer having a total apparent molecular weight in the range of from 50 to 180 kg/mole, while the resinous blocks A' shown an true molecular weight in the range of from 3 to 20 kg/mole and preferably from 5 to 15 kg/mole,

(c) from 25 to 80 parts by weight of a linear crystalline polymer comprising propylene as major component, with a Vicat softening temperature in the range of from 130°C to 180°C and a MFR in the range of from 0.5 to 30 dg/min and a polydispersity index of at least 4.5,

(d) from 100 to 250 parts by weight of a softener compatible with blocks B and B',

(e) from 0.01 to 3 wt%, relative to the weight of the primary components (a) up to (e) of a solid chemical nucleating agent of the endothermic group in combination with a blowing agent, and optionally

(f) one or more secondary components selected from PPO and/or any resins compatible with block copolymer component (a), antioxidants, UV-stabilizers, flame retardants, surface modifying agents and inorganic fillers.

2. Foamable compositions according to claim 1, which comprise as components

(a) and (b) at least one block copolymers of the general formulae

ABA , $(AB)_nX$ or $ABA''B''$ and $A'B'A'$ $(A'B')_nX$ or $A'B'A''B''$

respectively, wherein A, A' and A'' represent a poly(monovinyl arene) block and

B, B' and B'' represent a hydrogenated poly(conjugated diene(s)) block,

wherein n is an integer ≥ 2 and wherein X is the remainder of a coupling agent,

wherein the blocks A, A' and A'' are different and the blocks A are larger than

the blocks A', which are in turn larger than A'', while the blocks B and B' are

larger than B''.

3. Foamable compositions according to claim 2, wherein the block copolymer component (a) has the formula ABA or $(AB)_nX$, has a total apparent molecular weight in the range of from 250,000 to 600,000, wherein A represents a substantially pure poly(styrene) block and wherein the poly(styrene) block content in said block copolymer (a) is in the range of from 20 to 35 wt% and wherein B represents a hydrogenated poly(butadiene) block.
4. Foamable compositions according to claim 2, wherein the block copolymer component (b) has the formula $A'B'A'$ or $(A'B')_nX$, has a total apparent molecular weight in the range of from 80 to 160 kg/mole, wherein A' represents a substantially pure poly(styrene) block, each having a molecular weight in the range of from 5 to 15 kg/mole.
5. Foamable compositions according to claims 1-4, wherein the weight ratio between the block copolymer components (a) and (b) is in the range of from 10 to 40 parts by weight of component (b) per 100 parts by weight of component (a).
6. Foamable compositions according to claims 1-5, wherein component (c) is a single polymer or a mixture of polymers predominantly composed of propylene monomer or a copolymer of predominantly propylene with a minor proportion of a different alkylene selected from ethylene or butylenes, i.e. less than 25 wt% of the monomer mixture.
7. Foamable compositions according to claim 6, wherein component (c) has a melt flow range between 2 and 15 dg/min at $230^{\circ}\text{C}/2.16\text{ kg}$, a Vicat softening

temperature in the range of from 130 to 170°C, and occurs in a weight ratio of from 42 to 65 parts by weight of (c) per 100 parts by weight of (a).

8. Foamable compositions according to claim 7, wherein the component (c) shows a polydispersity index ≥ 5 .
9. Foamable compositions according to claims 1-8, wherein component (d) is a paraffinic oil.
10. Foamable compositions according to claims 1-9, wherein component (e) is selected from mixtures of NaHCO_3 and citric acid or sodium citrate, on amounts of from 0.5 to 1 wt%, relative to the weight of components (a) up through (e).
11. Foamed articles derived from the compositions according to claims 1-10.
12. Pre-blends for the preparation of the foamable compositions according to claims 1-10, comprising either the components (a), (c) and (d) or the components (b), (c) and/or (d).